Office Copy

CACTUS AND SUCCULENT JOURNAL

Of the Cactus And Succulent Society
Of America

Vol. VIII MAY, 1937 No. 11

Lithops lesliei
One of the "Stone Faces" from South Africa.
From the Cactus Book by van Laren.

CACTUS AND SUCCULENT JOURNAL

Published and Owned by the Cactus and Succulent Society of America, Inc., Box 101, Pasadena, California. A monthly magazine to promote the Society and devoted to Cacti and Succulents for the dissemination of knowledge and the recording of hitherto unpublished data in order that the culture and study of these particular plants may attain the popularity which is justly theirs. (Membership and subscription $3.00 per year. Foreign $3.00 per year by International money order.) Mail application to SCOTT HASELTON, *Editor*, Box 101, Pasadena, Calif. *Editorial Staff:* THE ENTIRE SOCIETY.

Vol. VIII MAY, 1937 No. 11

CACTUS AND SUCCULENT SOCIETY MEETINGS

Memorial Day joint meeting with the Arizona Cactus & Native Flora Society. Assembly 7:00 a. m. (6:00 a. m. Pacific Time), Sunday, May 30th, at Papago Park, a few miles east of Phoenix. The morning will be spent in visiting gardens and travelling to the Boyce Thompson Southwestern Arboretum at Superior; a picnic lunch will take place at noon. Those who are able to remain over night may camp at the Casa Grande National Monument and visit the Carnegie Desert Laboratory at Tucson on Monday morning. Send to Howard E. Gates, Anaheim, Calif., for detailed itinerary and final information sheet.

Sept. 4, 5 and 6: Labor Day field trip into Lower California, Mexico.

Sept. 17-Oct. 3: Annual Cactus & Succulent Show at Los Angeles County Fair, Pomona.

COMPLETION OF BRITTON AND ROSE

After 6 years it is a pleasure to announce that all four volumes of both editions of the reprint of THE CACTACEAE will be ready to ship by June 20th. It seemed advisable to make one shipment for all four volumes since the date of completion of volumes III and IV was so close to that of Vol. II.

The history of the production of the first printing by Carnegie Institution and this reprinting by the Cactus Society would indeed make a story. In Washington, much of the material was destroyed by fire and then the balance of the plates survived a flood in Los Angeles. Many of the engravings had to be duplicated at great expense.

The many fine letters of appreciation for the completion of this work is sufficient compensation for the undertaking and it is hoped that all readers of this reprint will be well repaid for their encouragement.

SCOTT E. HASELTON.

R. W. POINDEXTER NURSERY, 1000 North Temple Street, corner of Rosecrans Avenue, Compton, California. I have purchased, entire, the well-known Euphorbia collection of Mr. G. A. Frick. It is on display here.

"THE STAPELIEAE" by White and Sloane
(Second Edition)
A monograph in three volumes containing 1200 pages; 39 pages in full color in addition to the 1250 illustrations. Distribution of Species with maps in color, chronological notes, Glossary of terms, and complete Keys add to this valued work. Price $12.50 by express; $14.00 foreign postpaid.
WHITE AND SLOANE COLLECTION
1421 Dominion Ave., Pasadena, Calif.

KAKTUS ABC, by Curt Backeberg and F. M. Knuth, 432 pages fully illustrated. Many new species and genera. Written in Danish, but is a necessity for every cactus library. The lists show 500 more species than were recognized by Britton and Rose. Cloth bound $5.00. Box 101, Pasadena, Calif.

NEW SEED LIST
R. W. Kelly, 2410 La Rosa Dr., El Monte, Calif. 16 pages 6x9, illustrated. Listing many varieties of seeds which have not been available heretofore. Sent free if you mention the JOURNAL.

Cactus intortus and other West Indian Cacti can be secured without special permit from G. Anton, Box 922, Mayaguez, Puerto Rico.

RIO GRANDE VALLEY CACTUS GARDEN
J. R. PIRTLE & SONS,
EDINBURG, TEXAS
Native and Exotic Cacti and Other Succulents
Wholesale—Retail
Write for our Price List

CACTUS—by van Laren. Contains 140 pictures in full color of correctly named cacti. Written for the amateur as an introduction to these fascinating plants. Order now while still available. $5.00 sent express charges collect. Add sales tax in California.

Dendrocereus nudiflorus (Engelm.) Britton and Rose

Some Cuban Tree-Like Cacti

By BROTHER LEON, *Habana*

On the flats which extend between Quantánamo City and the United States Naval Station of Cuba, several tree-like Cacti may be observed in a few acres of ground.

Dendrocereus nudiflorus (Engelm.) Britt. & Rose

This wonderful species, presented to the readers in this Journal, October, 1935, in an excellent article of Mrs. Emma C. de Giménez Lanier, was first published by George Engelmann in 1869, and then long forgotten, until collected again by Dr. William R. Maxon of the United States National Museum, in 1907. It is one of the largest cacti of the world; likely the largest of all the known arborescent species. It is said to have been observed in Hispaniola and Jamaica, but, it is in Cuba that it seems to grow more abundantly. It is not rare on the northern coast of Havana and Matanzas provinces, on the south of Santa Clara, and in many places of the northern and of the southern coasts of Or-

Opuntia macracantha Griseb. (The trunk inclined.)
Lemaireocereus hystrix (on the right).

iente, growing mostly on coral limestone or surroundings, little higher than sea level.

Engelmann in the original description of this species, gives it as "subarborescens, pauciramosus," undoubtedly because himself, as well as the collector Charles Wright, had never seen an old plant of it. I have had that good fortune recently, at Novaliches, south of Guantánamo, where I saw it elevating its crown of branches above the surrounding vegetation of trees and shrubs. After the hard work of cleaning around, I took the photograph presented here, in which the trunk is exactly two feet and four inches in diameter. Two men standing below the lower branch show the comparative size of the plant. On the right and on the left, small trees may be seen, growing in contact with branches of their huge neighbour; they gently bent themselves to support its heavy branches and permit them to elongate far away, so that between the end of a branch and that of the opposite one, there may be a distance of 40 to 50 feet.

Another tree-like cactus of the same locality, is *Opuntia macracantha* Griseb.; its trunk is just

Pereskia cubensis Britton and Rose (in the center).
Cephalocereus brooksianus (around).

like that of a tree of any other family: 0.55 m. (nearly two feet) in diameter and branching only at 3 m. height. Of course, its flat articles make it to be recognized readily as a member of the Cactus family. But not far from there, another tree-like cactus, *Pereskia cubensis* Britt. & Rose would be recognized as a cactus only with great difficulty, if the plant is not flowered, and if the collector is not well acquainted with the genus *Pereskit.* It seems to be the best link between cacti and the leafy trees of other dicotyledoneous families.

OUGHT CACTI TO BE GIVEN FERTILIZER

By PROFESSOR DR. FRANZ BUXBAUM, Australia. *Translated by* DR. R. W. POINDEXTER

This question is answered in the negative by almost all German professionals! The leaflike cacti alone should receive fertilizer according to the unanimous opinion of all authors; also for Echinopsis references may be found that in order to flower freely a cow manure compost should be

used. But beyond these—no indeed!

Now this ready negation is quite false, according to my observations. It is the result of experiments with incorrect fertilizers incorrectly applied—often at the wrong time! A statement differing so greatly from the conviction which is so generally held must, however, have definite foundations.

I regret that it has not been possible for me to visit countries where cacti are native, but I had the opportunity, during a botanical research expedition in northern Africa to observe the deserts, the steppes and the cacti which are cultivated and which have gone wild there. If the conditions prevailing there may be compared with those of countries where cacti are native, then there are many features in common in respect to the plant nournishment contained in the soil.

The soil of the steppes, and likewise of the desert—the sandy desert excepted, naturally—exhibits, when viewed against the setting sun, a glistening as though snow were lying on it. This appearance arises from tiny salt crystals which separate out on the surface.

Whence come the salt solution to the surface? To answer this, we must study the manner in which this soil has been formed. The ground, which is very sparingly covered with plant growth, becomes excessively heated by the vertical rays of the sun, but at night, on account of the very low air humidity it cools extremely fast. In the northern part of the Saraha we felt these conditions strikingly on our own bodies, in that before sunrise we put on all our clothes and were still freezing, while a quarter hour after the sun was up we took off everything we could because otherwise the heat was unendurable. Stones often expand so suddenly that they fly to pieces with a report. Even the smallest pieces are constantly being further disintegrated by this difference in temperatures. In this way the soil becomes extraordinarily rich in nutrative salts. In the superficial layers this enrichment is still further concentrated in that water from seasonal rains is gradually drawn up from the deeper layers by the rapid surface evaporation. On its double journey through the ground, the water dissolves such a quantity of salts that, for example in the Matmata Mountains, in southern Tunisia thick plates of lime overlie the loamy soil.

Yet on account of the lack of water there is only a meager vegetation which is insufficient to use up this rich store of nutrative salts. As soon as the ground received artificial irrigation, it develops an enormous fruitfulness. This seems to me to prove that the soil of sparsely grown plains in hot, dry countries is very rich in nutritive elements.

How then have the failures arisen in the application of fertilizers to cacti under cultivation in homes and greenhouses?

In the first place, these are due to the composition of the manures or commercial fertilizers. All the commercial preparations are very rich in nitrogen—nitrogen is often the only fertilizing element they contain. Now nitrogen excites a pulpy growth. Cacti become too watery, too green and poorly spined. This is because nitrogen is the one element remarkable by its absence in the almost pure mineral soils in which succulents are native, and they are therefore not accustomed to it. On account of this over soft growth they have little resistance and easily go to pieces.

Furthermore in countries having cold climates cacti are customarily grown under glass even in summer; this absorbs the ultra violet light, and that means "shade" to a plant; often the plants are still further shaded. Under such a decrease in light these children of sunny lands have already the tendency to become too juicy and too soft and to underdevelop their spines. Now when, as is usually the case, both these errors are superimposed, a failure is inevitable, even though a third error, that of fertilizing during the resting period is not committed.

Now in practice, I compound a fertilizer which contains but little nitrogen, but on the other hand is rich in those elements which produce a slow but firm growth and a strong development of spines. Flowering is also promoted by this mixture. Besides a small amount of a substance is added which acts as a stimulant.

But even with this mixture a bad effect may result under certain circumstances; namely when the plants receive insufficient light. I keep my plants as long as possible in open sunlight; that means NO GLASS. Only the shade loving species—one soon learns to recognize them through observation—are not exposed to midday sun, but receive only morning and evening sunlight, but these also without glass. Otherwise they are not babied, but kept hard. If they are in good growth, they receive frequent applications of the nutrative mixture. I have treated plants with so much of it that the less soluble portions crystallized out on the top of the pot! The cacti which were so treated were as hard as wood, and spined like collected specimens! But the fundamental condition is plenty of open sunshine!

SUCCULENTS AT THE EMPIRE EXHIBITION JOHANNESBURG, S. AFRICA

By R. A. DYER

Some time ago your editor asked me to contribute a series of articles on South African succulents. Owing to pressure of work, however, I was then unable to do so, and although even now I have few idle moments, I have had the good fortune recently to go on a botanical collecting trip through some very interesting and botanically relatively unexplored country. Readers may be interested and I propose to give an account of the trip, in which succulents played an important part, beginning in the next number.

In a recent CACTUS JOURNAL I gave a brief account of the rockery at the Empire Exhibition, Johannesburg, and now for those of you who were unable to make the trip and see it for yourselves, I shall give some idea of the exhibit staged by the Botanical Section of the Department of Agriculture and Forestry. It must be understood that in this case a very small area was available in the Union Government pavilion and in the rectangular space of 16x4 ft. it was necessary to give a general representation of the work undertaken by the Botanical Section. Thus the succulents displayed occupied a part of a small whole, in marked contrast to the outdoor rockery built on such generous proportions. The design of the exhibit, a photograph of which is reproduced, was unique. It consisted of an open, somewhat boat-shaped base for the succulents with a superstructure to hold: (a) old botanical specimens at the ends; (b) books published by the section, across the center; (c) a number of the original paintings reproduced in FLOWERING PLANTS OF SOUTH AFRICA, above, with a vegetation map of South Africa in the middle. It was similarly staged on the other side.

It will be noted that the illustration at the top gives prominence to succulents; inflorescences and leaves of three species of *Aloe* and one *Gasteria,* appear in the bottom row of the left hand frame and two species of *Euphorbia* and five *Stapelieae* in the right hand frame. It is hardly worth while mentioning the specific

names as the details do not show clearly enough after so great reduction.

No doubt most readers will recognize *Euphorbia polygona* occupying the important central position in the rockery but it is impossible to discern the minute parasite *Viscum minimum* growing in the angles. This exceptionally fine specimen was brought up from Grahamstown about 700 miles away at no small amount of trouble, and few of the thousands of visitors realized its rarity. Some readers will recollect that an account of the occurrence of *Viscum minimum* on *Euphorbia polygona* appeared in the EUPHORBIA REVIEW, October, 1935.

It may be possible to recognize the white mottled *Aloe variegata* or "kan nie dood" near *Euphorbia polygona.* It derives its common name from its extreme hardiness. It "will not die" even if taken out and left on the hard stony, sunscorched countryside or "veld." There is a specimen of the popular *Euphorbia obesa* somewhat obscured towards the right, and scattered about are: *Haworthia cymbiformis, Gasteria pulchra* and another species of the same genus with opposite leaves, a few Stapeliads, two or three other species of *Euphorbia,* the tree *E. cooperi* being represented on the right by the top two sections of a branch, and in the middle foreground, just visible in shallow pans, a few groups of *Lithops lesliei* and other stone-like plants.

Unfortunately it is not possible to distinguish the plants on the extreme right of the photograph. In this section a small group of American Cacti, kindly donated by your Mr. Frick, was exhibited for comparison of their growth-form with that of various species of South African succulents, particularly of the genus *Euphorbia.* It is a general rule for the public of South Africa to refer to indigenous succulents as South African Cacti. Although we admire Cacti, it is our great desire to correct this misconception. Having heard many visitors refer to the collection as South African Cacti, two large labels were printed, the one *"American Cacti"* and the other *"South African Succulents not Cacti."* Although many people looked at the plants subsequently without reading the labels, some did and these generally registered surprise or even blank amazement.

The succulents suffered, not so much from handling by the public, but from the lack of sunlight. Pessimists considered that all the great rarities would be removed gently by overenthusiastic collectors of trifles. This did not happen, and, even if some of the soft leaves of *Haworthia cymbiformis* and *Lithops lesliei* were squeezed to bursting point, they at least served as an instructive object lesson to some keen students.

The magnificent outdoor rockery mentioned previously, has been very favorably commented upon by vast crowds of visitors and particularly those from overseas. I cannot speak from wide experience, but many travellers vouch that they have never seen anything of a similar nature to compare with it.

The account of the Swarziland—Zululand trip will be commenced in the next number.

COLLECTING IN DUBLIN, IRELAND

We have a very fine botanical garden in Dublin befitting Ireland's capital city. November is the month that for some reason they choose annually to repot and rearrange the Cactus House. I imagine that it is partly due to the fact that just then there is little other work they can do in the gardens and it is not chosen with regard to the most appropriate time for the plants.

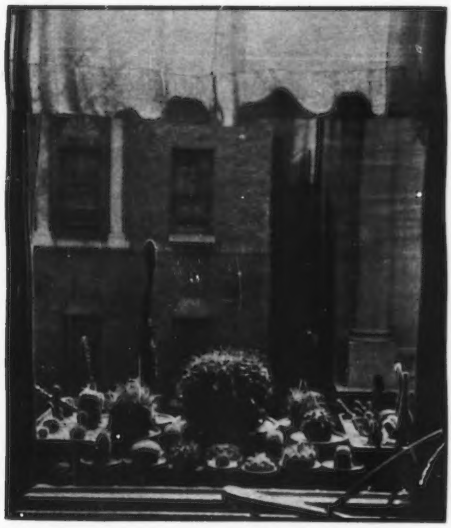
At all events I was given upwards of nearly forty different Succulents, but none of them rooted specimens, merely cuttings, and not of my selection. These I potted myself and certainly did not overwater them though perhaps I did the reverse. We have had one of the worst winters within memory here, not of any particular acute severity, but prolonged damp and cold. Of course we always have these factors to contend with, but not by any means so continuously as during the past winter. I used in conjunction with sand, pulverized pots and rubble, some peat loam as our soil here is a heavy clay which I did not consider sufficiently conducive to drainage. I am now of opinion that there was an undue proportion of this loam composed of decaying vegetable matter (heather, etc.). At all events all went well until February when some form of rot developed and the weather was horrible. I did all I knew how. I pared off the decayed portions and repotted, using fresh material, but without achieving success except in one instance. If it had occurred a month later there would have been more chance to succeed.

I lost about fifteen altogether which dampened my enthusiasm and it is only now with the commencement of Spring weather that I am taking a more optimistic view and having a relapse of "Cactitis."

I was unsuccessful with several batches of seeds I procured in England. Knowing that the hothouse would not be high enough in temperature for germination I experimented with an ordinary incubator for eggs, but I was afraid to overdo the moisture and I now believe that I underdid it.

You have enquired about collections in Ireland and I regret that I cannot give you much information. Outside of Dublin I have not been able to trace anything of much interest. I hunted around Belfast last year, but even in the Botanical gardens these Succulents are almost entirely absent. I understand that there are a few persons of German extraction about Dublin who have cacti, but so far as I can gather only one of them has a collection of any size. I have not had an opportunity of looking him up, but have intended doing so for months past.

HENRY B. FOTTRELL.



Growing Cacti in a New York Apartment

By PRESTON J. DUNN.

During my brief period as a member of our society (and before, in examining certain bound volumes of the JOURNAL) few accounts have appeared, if memory serves, which concerned the experiences with cacti of city apartment dwellers on the eastern coast. In view of the interest such a history might have offered during my earlier groupings, I am persuaded to recount sundry of the trials and errors endured, or more properly, enjoyed.

Being out of the "cactus zone," from afar, the Southwest appears to be such a terrestial paradise, where at least an acquaintance with these plants is relatively widespread, it was only by chance that a passive interest was changed to the well known status which occurs following the acquisition of a cactus plant. As a schoolboy in Wyoming the *Opuntia* beds were familiar sights, with their orange-yellow flowers (and ants), but it remained for a gift of cactus plants after city years to induce the proper attitude.

It is genuinely surprising to consider the meager knowledge of the typical florist in this region, even of the few cacti which he may possess. However, a few plants were acquired, and visits to the collection of the New York Botanical Garden opened vistas and gave opportunity to become acquainted with many of the species.

Even soil presents quite a problem where all is stone and steel, especially since only "fertilized top soil" is for sale. In collecting cacti, one had also to become a collector of soils, and it became a habit in country rambles to note a particularly suitable soil or sand, or outcropping of limestone or of decomposing granite, and to bring it promptly to (paper) bag. Visits to more or less incredulous wrecking contractors were also made—for old mortar and an occasional brick, all these materials to repose in their several "bins," and thence to be compounded into various composts thought suitable for the different plants.

Incidentally it seems well to use several sands or loams, in adding that portion of the compost which calls for sand, or loam, as the case may be; this as an insurance against the lack of some desirable element in the soil of any particular locality. Especially might this be true in potting such plants as *Echinocactus polycephalus* or *E. horizontalonius*, which are reputed as difficult to keep contented in cultivation.

At first it was scarcely suspected that there might be a society of those interested in cacti

and other succulents, or dealers who largely or almost entirely, devote their time to these plants. Even the literature on cacti and succulents was a surprise to one who formerly gave no thought to the subject; but fortunately the greater part of this literature became available, including "THE CACTACEAE." To have known one initiate (a rara avis in these parts) would have greatly shortened the route, and yet there are also pleasures in independent discovery.

Watering is certainly a great temptation, especially in a winter apartment. One reads of the suitability of the dry, steam heated apartment for cacti, and such statements are not always accompanied by information regarding the nature of growth of these plants. As a result, many beginners, I feel sure, consider winter growth to be generally desired and natural, at a time when most plants should be dormant.

During the first winter I watered about once a month, fairly heavily, as I had read somewhere or other, and as a result had some odd etiolations by spring, as well as rather fewer plants. Except for certain of the "softer" species, I now water not at all in winter, and confine myself to an extremely light spraying every few weeks to remove dust. Practically none of this water reaches the soil, and all has soon evaporated; in other words this amounts to no more than washing faces. They seem generally to do well and I would be afraid they would grow if more water were given, even if no worse befell.

When possible I use rain or snow water, at room temperature, though this may be unnecessary trouble. In any event, with this climate, it behooves one to take no chances, and I think that many who speak of winter as a time when diseases are troublesome, would fare better with drier plants. I dry them off grandually, beginning late in August and practically ceasing to water early in October. Perhaps I should begin even earlier in August, but our outdoor season is very short.

In winter, I keep them on a large table, with lower abutments for holding window boxes, in which the smaller plants are inbedded, pots and all, in sand. The table is kept a foot from the windows, fortunately with full southern exposure, and well distant from radiators. In early spring, and when warm enough, the windows are opened for direct sunlight.

By May, at which time the season's transplanting, repotting and general annual improvements are largely accomplished, they begin to take their summer stations on (again fortunately) rather deep window sills, where, with the manipulation of awnings, they may be protected from excessive rains. Each plant is in a separate pot, although the smaller plants with their pots, as indicated above, are sunk in boxes of sand, so that the soil may be kept more evenly moist during the growing season.

In summer I water rather heavily in the early evening, once or twice a week, depending on the weather, and allowing the rains to perform this function when they are amenable and on schedule.

Perhaps my treatment of cacti as a whole is influenced by the fact that I consider the most interesting of my plants to be certain *Echinocactanae* of fair size. It seems likely that the requirements of favorite plants may tend to unconsciously regulate one's attentions to the others, and particularly the frequency of such attentions. Undue hesitancy in watering may thus have resulted from a principal interest in *Ferocacti* (possibly not the most fortunate interest for this region). However, I would say that a collection on the eastern seaboard would certainly fare better if regulated from the requirements of this genus than, say, of species such as *Nyctocereus serpentinus;* for I fear that the tendency, when watering the principal plants, is to share a little of the bounty (?) all around.

The relative slowness of some cacti in expressing approval or disapproval of certain methods is also a complicating factor; especially are some leisurely in expressing approval. Contentment with a reasonable growth, rather than sailing too close to the wind, seems the safer policy in this climate (at least for the *Ferocactus* enthusiasts).

In fine, this purports to be a sample, climatically speaking, of "how the other half lives," and if no other purpose is served, perhaps some amusement may be afforded to our confreres in California. It is only to be regretted that many impressions and experiences have slipped away, or have been dulled by the passage of time.

TEXTBOOK OF SYSTEMATIC BOTANY by Swingle. This book is highly recommended for the student who feels the need of botanical information. Written for the student, Dr. Swingle, who is a member of the Nomenclature Committee, has made possible this vast source of information. Some of the chapters are: Evolution, Classification, Developments of Systems, Nomenclature, Preparation of Herbaria, Terminology, and a most readable description of Plant Families. Send $2.50 to CACTUS

REPRINT IN PAMPHLET FORM

"Collecting Succulents in Mexico," by Eric Walther
16 pages..... 25c

FIG. 1. *E. x mutabilis* Deleuil, app. x. 0.5

ECHEVERIA HYBRIDS

By ERIC WALTHER, Botanist Golden Gate Park

Echeveria x mutabilis Deleuil.

In continuation of our present series of hybrid Echeveria's grown locally, both old-timers and novelties, and whether of definitely known parentage or not, we herewith submit pictures and descriptions of *E. x mutabilis* Deleuil. In the 70's of the last century *Echeveria* had a

FIG. 2. Inflorescence of *E. x. mutabilis,* app. x 1.5

period of great popularity in Europe, and numerous hybrids were reared by French and Belgian nurserymen in particular, of which Mons. Deleuil was perhaps the most active. The hybrid to be discussed here was raised by him too, and was first described in his catalog for 1874. From an evident copy of this description, re printed by Ed. Morren in LA BELGIQUE HORTICOLE, we offer the following translation:

"Hybrid of *E. linguaefolia* and *E. scheerii;* Interesting plant, with leaves spatulate, spreading, 10-12 cm. long, glaucous-violet-green in greenhouse, out-of-doors a beautiful yellowish-rose edged with purple. Inflorescence a trailing spike; flowers light yellow, petals edged with rose."

Passing mention of the name may also be found in Bailey's CYCLOPEDIA OF HORTICULTURE, page 1087, where Dr. Rose adds nothing to our knowledge of the matter. A specimen determined by Dr. Rose as *E. x mutabilis* was sent us from the New York Botanic Garden, No. 6629, through the courtesy of the late Dr. Britton and is unquestionably identical with our plant. This may be described as follows:

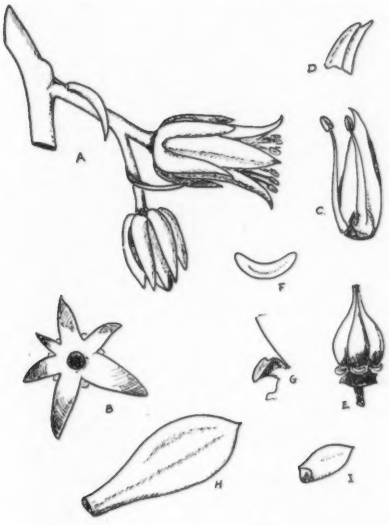
Description, of living plant in coll. of Victor Reiter, jr.:

Stem 10-30 cm. tall; *leaves* 25 or more, in lax rosettes, obovate-spatulate to oblanceolate, 5-7 cm. long, 2-3 cm. broad, thick, concave above, turgid to edges, apex obtusish, mucronate, color parrot-green or bice-green, often tinged yellowish; *inflorescence* decumbent, laxly paniculate, 15-75 cm. long; *peduncle* weakly flexuose; *lower bracts* many, ascending-spreading, 2-3 cm. long, obovate-oblong, acutish; *branches* short, lower with 2-5 flowers, upper single-flowered; *upper bracts* and *bractlets* linear-lanceolate, 6-10 mm. long; *pedicels* slender, 7 mm. long, with 2-4 bractlets, color orange-vinaceous; *sepals* appressed, linear-lanceolate, acute, somewhat unequal, to 9 mm. long, color light-cress to deep-lichen-green, greenish-glaucous; *corolla* 9-10 mm. long, 4-5 mm. in diameter at base, 3-5 mm. at mouth, color pale-turtle-green, to pale-cinnamon-pink in sun; *segments* thin, scarcely keeled, narrow-lanceolate, acuminate, united at base for at most 1 mm., there they are distinctly, if shallowly hollowed; *stamens* unequal, longer than carpels, the longer ones nearly as long as corolla; *carpels* slender, erect, papillose, pale-turtle-green; *styles* slender, outcurved, nopal-red at tips; *nectaries* narrow, transverse-lunate, truncate, secreting abundant honey.

This has gone under several aliases locally, such as *E. alpina, E. linguaefolia,* etc. It has nothing to do with *E. subalpina* Rose & Purpus; and *E. linguaefolia* Lemaire too is quite easily distinguished, as may be seen by comparison with the photo's here published recently*

In view of their recorded relationship no surprise need be felt at their similarity and confusion; the influence of *E. linguaefolia* is evident in the trailing panicle with short, few-flowered branches, pale petals, appressed sepals, etc. Whether *E. scheerii* Lindley had anything to do with this cross is more than doubtful, and we can see nothing here even remotely indicating the participation of any *Echeveria* so closely related to *E. grandifolia,* as *E. scheerii* certainly is. This hybrid really needs to be contrasted only with *E. linguaefolia* and *E. expatriata.* From the first it differs in its thinner, more pointed, faintly papillose, yellowish-green leaves, in its more slender peduncle and branches, the latter with more numerous flowers on more slender pedicels, in the shorter, narrower, more slender sepals, etc. *E. expatriata* agrees with both before-

*Cactus Journal, 8:6:87; 1936.



mentioned *Echeveria's* in its long stamens, but differs in its smaller, glaucous, smooth leaves and its smaller flowers which are more spreading, thicker, shorter and have more sharply keeled petals; sepals only 4 mm. long, etc. As no definite locality is known for the source of *E. expatriata,* we may justly surmise that it also owes its origin to hybridization, with perhaps *E. linguaefolia* Lem. concerned in this matter, too.

FIG. 3a. Two flowers of *E. x mutabilis* Deleuil, app. x 2.
b. Calyx, *E. x mutabilis* Deleuil, 2.
c. Inner view of petal, x 2.
d. Tip of petal, x 10.
e. Carpels, x 2.
f. Nectary, front-view, x 10.
g. Nectary, side-view, x 10.
h. Leaf, x 0.5
i. Bract, x 0.5

Xerophyte Exhibit

Of the Brooklyn Botanic Garden at the 24th International Flower Show, March 15-20

By HERMAN F. BECKER,

EDITOR'S NOTE: *Readers will find this detailed description of Mr. Becker's exhibit most interesting. Such institutions as the well known Brooklyn Botanic Garden are doing a most constructive work by developing a wider interest in Succulents.*

Thanks to the efforts of the Garden's untiring Horticulturist, Mr. Montague Free, whose rare ability in selection of plants and their combination of educational value with beauty and effect, and also thanks to the Growers, who produce the best of material under difficult city conditions, the Botanical Gardens exhibit is rewarded almost annually with gold medals and nationwide appreciation.

Representing an educational Institution, it is not the Garden's aim to show an extensive collection by a mass of beautiful plants, but rather a few typical representatives of each group or family with a different and individual adaptation to conditions of drought. These drought-plants naturally include all our Cacti and Succulents, but also on a much larger scale embrace many other groups as described below.

This exhibit of Xerophytes chiefly points out their characteristics in regard to drought and dry period resistance. Such plants can *escape* drought and thrive where the water supply is scarce by brevity of their life cycle. Some *evade* drought by deep rooting, by reducing leaf surface and shielding the pores or stomata or by developing impervious cuticle. Others *endure* drought by special adaptation of root, stem or leaf for water storage. Owing to lack of space at the exhibit each of those xerophytic types is represented by only a limited number of species. Desert annuals, such as *Brachycome iberidifolia* and *Venidium decurrens* form with rare relatives of *Mesembryanthemum* the center of the desert plains, while rising trees with various tropical epiphytic Xerophytes lend height, color and effect to the background.

Due to the dry environment, species of *Kleinia* produce few leaves, if any; but given sufficient water under a higher degree of humidity, they respond by developing abundant foliage. This also applies to *Pedilanthus* and several Cacti, i.e. *Opuntia subulata,* as on display. There is opportunity to compare these plants grown in dry or moist greenhouses, respectively with or without leaves. While their foliage is shed in drought, they carry on with their succulent green stems.

Many *Mesambryanthema,* relatives of the Fig Marygold, resemble stones. This mimicry no doubt prevents their destruction from foraging animals. The transpiration area is small compared to the bulk, water is stored in them and

Brooklyn Botanic Garden Exhibit at International Flower Show, March, 1937

thus enables the plant to withstand drought. They are mostly completely covered with soil except for their truncated tops. These form a transparent, windowlike surface, through which the light is permitted to penetrate almost to the base of the interior of the plant. Rarer types of this group as found in South Africa and Namaqualand and represented in the exhibit are species of *Conophytum, Argyroderma, Lithops, Pleiospilos, Lapidaria, Faucaria, Rimaria,* and many others. *Fenestraria aurantiaca* and *F. rhopalophylla* are of special interest for their pronounced "windows." Water stored in surface vesicles, especially prominent on "ice-plants," may also be observed on *M. cordifolium* and *M.* (*trichodiadema*) *densum. Ceropegia woodii,* related to the Milkweeds or ASCLEPIADACEAE, overcomes drought by means of fleshy leaves and waterstoring tubers. Thanks to Mr. Alain White and Mr. Boyd L. Sloane we were also able to present in this group several wonderfully developed specimens of *Trichocaulon flavum, T. officinale, T. meloforme* and *Hoodia gordonii,* all from South Africa.

Another group of rare and small *Crassulas* is worth mentioning. There are *Crassula tecta, C. teres, C. columnaris, C. pyramidalis, C. archeri, C. deceptrix* and the green form thereof. The combination of fleshy leaves with protecting hair is rather uncommon. We find this phenomenon in *Echeveria leucotricha,* in *Kleinia tomentosa* and *Bryophyllum alicae.* In a crested form of *Echeveria whitei,* which originated at the Brooklyn Botanical Gardens in 1932 and has not been distributed as yet, we seem to have one of the rarest and oddest pieces of the collection. It seems to me unnecessary to mention Agaves, Aloes, Haworthias, Gasterias or even Sedums and Echeverias, since they are only too thoroughly known for their succulent properties.

One is, however, justified to speak a few words on behalf of our well-known and beloved Cacti, whose membership to the succulent-xerophytic world we take for granted. Their cleverness in adaptation and cheating the sun out of a few drops of water is no less interesting than that of less known succulents. Their spiral or vertical ridges increase assimilation surface, whereas transpiration is kept low, because the ridges are set at an acute angle to the sun's rays. The thick ly or sparsely set spines more or less shade the transpiration area and thus reduce loss of water. Most Cacti do not normally produce leaves. The functions performed by leaves are taken over by the stems, which serve as water reservoirs. As an additional protection they are usually covered by a waxy "bloom." Only few Cacti produce true leaves, i.e. the Mexican *Pereskiopsis velu-*

tina. In non desert regions Cacti live on trees. They are epiphytes, without, however, obtaining food from their host; they are not parasites. Our tree presents a fine selection of *Epiphyllum, Cereus trigonus, Rhipsalis* in many varieties, some of which are 5 feet long. In a 2 foot piece of *Selenicereus pteranthus* we have a striking example of the power of a plant to withstand adverse conditions. This stem attached itself to a steel rafter of the greenhouse, then separated from the original plant, lived there for nearly 4 years without soil or food, never growing, but still green and very much alive. With several splendid Euphorbia, whose "latex" or milky juice helps prevent desiccation, the group of succulents is concluded.

There are, however, plants that cannot be recognized as Xerophytes at first sight and are only botanically classified as such. Their habitat ranges from our northern hemisphere into the tropics and embraces partially much sought after plant varieties. In our Moorlands we find plants with the stomata shielded so that the water vapor escapes only with difficulty. Halophytes are Xerophytes. Seashore plants, although growing in wet locations, are unable to absorb sufficient moisture, because salt in the rooting medium makes it physiologically dry. As example we present amongst others the Sea-Kale, *Cramba maritima* and Samphire, *Salicornia herbacea. Selaginella lepidophylla,* the Resurrection Plant, curls up and rests during the dry season evading drought. When the rains come, it opens up again and resumes active growth. *Nephrolepis cordifolia* stores moisture in subterranean tubers, which also applies to bulbous plants. We have on display *Tulip kaufmanniana* and *T. clusiana,* the Peppermint Candy Plant.

A tree with epiphytic Orchids explains how these inhabitants of the tropics survive the dry season by shedding their leaves (*Dendrobium*); how they overcome their dry environment by producing leathery leaves (*Vanilla*), or pseudobulbs (*Cattleyas*) and most others which store water and food. Few pores, minute perspiration enable these plants to endure unfavorable seasons. Another tree is inhabited by colorful *Bromeliads,* relatives of our pineapple. The water that falls on their leaves, runs to the leaf bases, where it is retained until absorbed or evaporated. Our famous Spanish Moss, *Tillandsia usneoides,* as an "Air" plant is given considerable interest. Although many Epiphytes grow in moist climate, they are essentially xerophytic, owing to the periodical dryness of the substratum.

It is only natural that an exhibit of Xerophytes with such unusual characteristics and presented as an educational suggestion, should attract the attention of the public and arouse its curiosity. Even Paramount Motion Picture Company found it worth while to news-reel and Lowell Thomas to speak in particular about our "window and Air-plants" over a nationwide hookup. The exhibit was again awarded a gold medal, a special cash prize, and a special award of merit from the Garden Club of America.

Crested form of *Echeveria whitei*

SCHWARZ & GEORGI

Apartado No. 7

SAN LUIS POTOSI, S.L.P., MEXICO

Send twenty-five cents for our new illustrated catalog containing 325 different species of Cacti and Succulents.

Astrophytum capricornis var. *minor*

Special this month, eight of the following seedlings $1.00, or all for $2.00, postpaid.

Neomammillaria andalgensis.
N. vaupelli var. *flavispina.*
N. hoffmanni. — *N. perbella.*
N. cirrifera. — *N. polythele.*
N. albescens. — *N. vaupelli.*
N. calacantha. — *Coryphantha clava.*
Astrophytum ornatum. — *Oreocereus trolli.*
A. myriostigma. — *O. celsianus.*
Cephalocereus senilis. — *Thelocactus leucanthus.*
Echinocereus sarissiphorus.

Send for new, enlarged illustrated catalog, free.

KNICKERBOCKER NURSERY
R 1, San Diego, Calif.

FERDINAND SCHMOLL
Cadereyta, Qro. Mexico

Owner of the export permit of the Mexican Government offers you his well-known selected cacti and other succulents at moderate prices.

A NEW MONSTROSUS

By an experiment which proved successful I have been able to cause a *Lemaireocereus griseus* to grow into a monstrose form. While it was several years ago that I developed my first plant of this very interesting monstrous, I have been reluctant in advertising it until I was certain that it would keep its form. I am now able to offer this beautiful monstrosus in sizes from 50c, 75c, $1.00 and $1.25 each postpaid in U. S. A. All plants are fully guaranteed and are grafted in such a manner that they will grow.

TEGELBERG CACTUS & SUCCULENT GARDENS
600 West Kelso St., Inglewood, California

RARE GRAFTED MAMILLARIAS

Blossfeldiana ..... .50
Bullardiana ..... .50
Gatesii $1.00
Guirocobensis ..... .50
Peninsularis $1.00
Petrophila $1.00
Sartorii ..... .35
Schmollii ..... .35
Cochemeia maritima, grafted..... $1.50
Cochemeia setispina, grafted..... $1.50

GATES FAMOUS CACTUS GARDENS
ANAHEIM, CALIF.

THE CHEAPEST DEALER IN JAPAN

	Postage needs
Cereus pitahaya monst. var. crest....	30c
Notocactus mammulosus crest	30c
Gymnocalycium mihanovichii crest...	$1.00
Gymnocalycium quehlianus crest....	30c
Rebutia minuscula crest.....	10c
Euphorbia bubalina crest.....	$1.00

Orders from U. S. A. must enclose IMPORT PERMIT of Department of Agriculture. List will be sent on request.

ISIDA CACTUS NURSERY
Yosida, Odagun, Okayamaken, Japan

HUMMEL'S EXOTIC GARDENS
Early Orders Get the Plants

Cleistocactus strausii albispina..... .25
Cephalocereus senilis, grafted novelty..... .25
Rhomboyphyllum nelii ..... .25
Haworthia plainifolia (rare)..... .50
Coryphantha nelii (smallest Coryphantha).. .50
Aloe ausana (small)..... .50

Combined $1.60, postpaid

4848 Imperial Highway — Inglewood, Calif.

SOUTH TEXAS BOTANIC GARDEN
Box 213, Laredo, Texas

Pending the issuance of our regular price-list, a post card will bring you our temporary list. We have probably the most complete assortment of North American cacti in existence today, including many of the rarer and recently discovered species.

SEEDLINGS

Neomammillaria camptotricha, 1½ in.
N. pringlei, 1½ in.
Cephalocereus senilis, 1½ in.
Carnegiea gigantea, 1½ in.
Cleistocactus baumannii, 5 in.

All for $1.00, Prepaid, U. S. A.

KENNEDY'S CACTUS GARDEN
1765 Stanley Ave., Long Beach, Calif.

RARE SEEDS
from the West Indies Ecological Expedition.

Cephalocereus swartzii, pkt..... .25
Mammillaria prolifera, pkt..... 10
Melocactus lemairei, pkt..... .10
Melocactus melocactoides, pkt... .10

Hundred of other rare species in my free illustrated 1937 seed list.

R. W. KELLY
2410 La Rosa Dr., El Monte, Calif.

CORNELIUS RARE PLANTS

Malacocarpus gressei crest; a fine one..... 75 cts.
Mamillaria boeasana inermis; little snow ball.. 35 cts.
Etus—*Platensis*, 1¼ in..... 35 cts.
Etus—*Quehlianus*, 1¼ in..... 35 cts.

The 4 plants prepaid in U. S. A. $1.80.

Euphorbia grandicornis, 8 to 10 in..... 50 cts.
E. ornithaupus ..... 40 cts.
E. caput-medusae head..... 35 cts.
E. caput-medusae major..... 35 cts.
E. phersdorfii ..... 35 cts.

The 5 plants prepaid in U. S. A., $1.80
3429 San Fernando Rd., Los Angeles, Calif.

Send $1.25 for new Cactus Book, 235 photographs named, priced—and list over 600 kinds rare plants. Full culture instructions. Rare, new introductions from Peru, Bolivia, Argentina, Old Mexico.

RARE PLANT GARDENS
Cisco, Texas